UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/736,654	12/12/2000	Ron Kimmel	10990172-1	8266

7590 06/30/2005

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EXAMINER
KIM, CHONG R

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/736,654	KIMMEL ET AL.
	Examiner	Art Unit	
	Charles Kim	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-26* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) *2-10,17-20,22 and 23* is/are allowed.

6) ☒ Claim(s) *1, 11-16, 21, 24-26* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Prosecution Reopened

Prosecution on the merits of this application is reopened on claims 1, 11-16, 21, and 24-

26, which is considered unpatentable for the reasons indicated below:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1.   Claims 1, 11, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by

"Skeletonization via Distance Maps and Level Sets" by Kimmel et al (hereinafter Kimmel)

Re claims 1 and 21, Kimmel discloses identifying a boundary of a source image (abstract

line 4-5); and assigning a distance value to each pixel of a distance map (abstract lines 5-6),

which the distance is between a center of the pixel and the nearest boundary curve (p. 382, right

column, lines 15-16), wherein the nearest point is located to sub-pixel accuracy (abstract line 11-

12).

Re claim 11, Kimmel discloses boundary curves defined by continuous parametric

functions (p.384, section 2).

2. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by "Euclidean Distance Mapping," by Per-Erik Danielsson (hereinafter Danielsson).

Re claim 1, Danielsson discloses identifying a boundary (background from object) of a source image (p. 227, line 3); and assigning a distance value to each pixel of a distance map (p. 227, first paragraph), which the distance is between a center of the pixel and the nearest boundary curve (this is the definition of a distance map; p. 227, lines 3-4; p. 231, 2nd full paragraph), wherein the nearest point is located to sub-pixel accuracy (p. 236, last sentence in the 2nd paragraph from the bottom states that Euclidean distance maps can be perform over noninteger distances which can be considered as sub-pixel accuracy).

3. Claims 12, 15, and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by "Using Resolution Pyramids to Efficiently Store Distance Transforms of Arbitrary Size" by Gunilla Borgefors (hereinafter "Borgefors").

Re claims 12 and 24, Borgefors discloses a method comprising the steps of computing a first distance map of a source image (p. 691, first paragraph), and downsampling the first distance map having a first resolution to form a second distance map having a second resolution (p. 692, lines 4-7 in first paragraph and 5th full paragraph).

Re claim 15, Borgefors discloses the first resolution is greater than the second resolution. (resolution pyramids have the parent with greater pixels than the child)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4.   Claims 13-14 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over

"Using Resolution Pyramids to Efficiently Store Distance Transforms of Arbitrary Size" by

Gunilla Borgefors (hereinafter "Borgefors").

Re claims 13 and 25, Borgefors does not mention applying a soft threshold filter to the

second distance map. However, a soft threshold filter may be a noise filter to remove any errors

from the source image map having the second resolution. Therefore it would have been obvious

to use any type of threshold filter to filter the image of Borgefors to remove unwanted noise or

errors, as broadly claimed.

Re claims 14 and 26, Borgefors does not disclose interpolating the second distance map

to generate an interpolated distance map having the first resolution. However, it is well know in

the art to reconstruct a downsampled image by interpolation. Therefore it would have been

obvious to modify Borgefors to interpolate the second distance map to generate a distance map

of the first resolution. Borgefors further does not mentioned applying a soft threshold filter to

the interpolated second distance map. However, a soft threshold filter may be a noise filter or

smoothing filter to remove any errors from an image. Therefore it would have been obvious to

use any type of threshold filter to filter the image of Borgefors to remove unwanted noise or

errors, as broadly claimed.

5.   Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over "Using

Resolution Pyramids to Efficiently Store Distance Transforms of Arbitrary Size" by Gunilla

Borgefors (hereinafter "Borgefors") as applied to claim 12 in view of "Skeletonization via

Distance Maps and Level Sets" by Kimmel et al (hereinafter Kimmel)

       Re claim 16, Borgefors discloses generating a distance map, but does not mention the

distance is to sub-pixel accuracy as claimed.   Kimmel teaches identifying a boundary curve of a

source image (abstract line 4-5); and assigning a distance value to each pixel of a distance map

(abstract lines 5-6), which the distance is between a center of the pixel and the nearly boundary

curve (p. 382, right column, lines 15-16), wherein the nearest point is located to sub-pixel

accuracy (abstract line 11-12).   Therefore, it would have been obvious to use the calculations of

generating a distance map to a nearest boundary curve to sub-pixel accuracy as taught by

Kimmel to provide a more accurate representation of the object.

Allowable Subject Matter

       Claims 2-10 and 17-20, and 22-23 are objected to as being dependent upon a rejected

base claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.

Conclusion

       The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

Euclidean Distance Mapping, by Per-Erik Danielsson, "Computer Graphics and Image Processing", Nov. 1980 vol. 14, no. 3, p. 227-48 discloses well know distance maps are generated from the center pixel to the nearest boundary.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 571-272-7421.
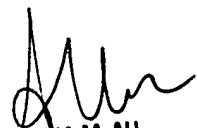
If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 571-272-7414.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov.

Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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